PROJECT NUMBER: 1806
PROJECT TITLE: New Tobacco Processes
SECTION LEADER: S. R. Wagoner
PERIOD COVERED: October, 1988

I. PROJECT ART - COMMERCIAL PROCESS DEVELOPMENT

A. **Objective**: To conduct trials providing information for development of the ART commercial process.

B. **Results**: Spotting analyses were conducted on several sets of cigarettes containing unextracted and extracted ART filler. The following results were observed:

1. Tests on extracted filler from the one liter laboratory did not show the tendency for spotting that has been observed in pilot plant material.

2. From an inspection of Bermuda Hundred Pilot Plant runs 220 and 221, it was concluded that extracted filler from the wax layer created significantly more spots than filler from the main body of the bed.

3. Cigarettes made from unextracted DL blend, and subjected to a standard QA defect audit, yielded 0.7 critical spots per 2000 cigarettes. (The third quarter 1988 factory audit showed 1.34 critical spots/2000 cig.)

4. Cigarettes from ART run 226, in which the filler was cased and dried immediately after extraction, yielded 12.5 critical spots/2000 cig in the standard QA audit. In addition, the QA audit of runs 238/239, which were precased with PG and glycerin in the AB solution, showed 29.2 critical spots/2000 cig.

5. A similar QA inspection of cigarettes containing 100% expanded ART filler yielded 12.0 critical spots/2000 cig.

6. Quality Engineering utilized the off-line inspection device to evaluate several sets of the above cigarettes. Their results showed that the unextracted DL filler produced 13.0 critical spots/2000 cig and the PG/G precased ART filler produced 45.5 critical spots/2000 cig. (For the QE device, Marlboro typically runs from 8 to 25 critical spots/2000 cigs.)

Samples of unextracted and extracted ART fillers were submitted to analytical microscopy for characterization of the surface. The unextracted filler was clean with no extra waxy deposits on the epidermal surface. Post-ART filler was shown to be covered with a combination of waxy substances. In the laboratory, various ART samples were dried in the vacuum oven. This treatment significantly reduced the amount of spots produced in the accelerated spotting test.

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A CV/OV/RH regression analysis of ART filler was conducted. Unextracted DL3 filler, uncased post-ART filler (run 207), and post-ART filler with casing and after-cut were conditioned at three humidity levels and analyzed for equilibrated CV/OV. Correction factors of 0.44, 0.45, and 0.41 cc/g/%OV, respectively, were generated for the above fillers.

Expansion runs of ART filler were conducted for Product Development work. All trials were run immediately following extraction, and used a tower temperature of 500F.

A list of acids and the corrosion potentials on Inconel and stainless steel was received from Bernie LaRoy to determine replacement levels for 12% monopotassium citrate on stem. Dissociation constants were found in the literature and relationships with temperature were determined. The ART process computer model was used to calculate the appropriate add-on levels.

C. **Plans**: With the aid of QA and QE, continue to quantify the level of cigarette spotting caused by ART filler. Conduct post-ART tobacco treatment tests with the Hauni HT tunnel and the vacuum conditioner to determine the effect on spotting.

II. BINDER DEVELOPMENT

A. **Objective**: Develop methods to produce binder systems for the foam bonded ends and low density rod programs.

B. **Results**: For the foam bonded ends program, CMC solutions of sodium, potassium, magnesium, and calcium salts were used to tip the ends of cigarettes. These will be subjectively evaluated for flavor enhancement of CMC.

A meeting was held with technical representatives from Grindsted to discuss the physical properties of pectin and their quantification. Surface tension and contact angle measurements were recommended, and our lab instruments will be modified to conduct these analyses for tobacco coated with pectin. Discussions included the use of emulsifiers to enhance adhesive quality, and a sample of the tartaric ester will be sent to us for experimentation.

C. **Plans**: Continue to provide support as required to the above programs.

III. HAUNI HT TUNNEL EVALUATION

A. **Objective**: Determine the effect of steam conditioning cut filler prior to drying in the Hauni HT steam tunnel.

B. **Results**: Check-out tests, using Marlboro filler exit production cutters, were conducted on the newly installed Hauni HT tunnel in

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the Semiworks. A punch list of modifications is being addressed. Equilibrated CV data have shown a 0.4-0.6 cc/g increase across the tunnel in these preliminary trials.

C. **Plans**: Complete equipment modifications such that an evaluation program can be conducted to determine the physical, chemical, and subjective characteristics of steam conditioned cut filler.

IV. TMCI-ASTA SHEET

A. **Objective**: To develop a subjectively and physically acceptable reconstituted tobacco sheet using the TMCI process and PM-RCB technology for international application.

B. **Results**: The Spanish tobacco to be used for particle size optimization trials in Tarragona was ground in Nuway Tobacco Company. Three grinds were made: (a) 90% <400 mesh, mean particle size (mps) 28μ; (b) 95% <200 mesh, mps 42μ; (c) 95% <120 mesh, mps 55μ (the normal grind in Tarragona is 65% <120 mesh, mps 104μ). Sufficient quantities of each grind (3000 lbs) were made to allow 8 hours operation at design throughput. The tobacco was passed by USDA for insecticide content on 10/6 and was sent to Spain after grinding on 10/18. The tobacco is now in Tarragona. The total reducing sugar content of this Spanish blend is again high (8.6% DWB) and no additional sugar will be required.

The slits in the ASTA product made during the May trials using fine dust (95% <400 mesh) were reproduced in the R&D laboratory. Water droplets were projected in an air stream across a partially formed handsheet. The slits were identical to those in the Tarragona product confirming that these slits were made by steam condensate escaping from the underside of the belt through the broken sealing bars.

C. **Plans**:

Evaluate the mechanical modifications to improve the Tarragona plant operation by running trials using tobacco ground in Nuway to 95% <400 mesh).

Witness one week of satisfactory ASTA process operation using the normal tobacco grind before running trials to optimize tobacco particle size in Tarragona.

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